

# TEACHING WITH TECHNOLOGY

## iPads and primary mathematics

Although they were not originally intended for use in classrooms, iPads and similar mobile devices are being purchased by schools all around Australia in the hope they will enhance the education experiences of our students. The need to integrate technology is now an essential aspect of Australian classrooms, with current curriculum documents expressing explicit expectations that ICTs are integrated into the teaching and learning of mathematics (Australian Curriculum Assessment and Reporting Authority, 2012; Board of Studies New South Wales, 2012). Literature around teaching practice and the use of ICT suggest the implementation of new technologies has potentially changed teaching and learning radically, providing opportunities for a shift of focus from the mechanics of action to a more problem-solving based approach (Resnick, 2006)

The introduction of iPads as teaching and learning tools can also potentially remove some of the existing barriers to successful ICT integration (issues with accessibility and technical support), with many also believing the devices have the potential to address a disparity between the way young people use digital media outside school, and the ways in which digital media are used within the classroom (Henderson, 2011; Selwyn, Potter, & Cranmer, 2009). This disparity is described by Selwyn et al. as a 'digital disconnect' between schools and learners. The distinct affordances offered by iPads when compared to the use of laptop and desktop computers include their affordability and ubiquitous access, mobility, ease of use, opportunities for more flexible learning spaces and more opportunities for students to author their own work rather than simply consuming the work of others (Ireland & Woollerton,

iPads are beginning to appear in more and more primary classrooms, yet it is difficult to find teaching ideas that promote deep mathematical understanding. Catherine Attard provides a list of teaching considerations to be used when using iPads and two practical ideas for using them.



2010; Kiger, Herro, & Prunty, 2012; Melhuish & Fallon, 2010).

So we know iPads have the potential to enhance teaching and learning, but how should teachers be using them to teach primary mathematics? In two recent studies (Attard, 2013; Attard & Curry, 2012), teachers found it more challenging to use iPads in interesting ways when teaching mathematics, in contrast to their use in other subjects. Often teachers tend to rely on applications (apps) that are specifically designed for mathematics, but focus on a drill and practice approach that simply replaces the repetition of a standard worksheet or textbook page with some added animation and colour. Sometimes the apps that are used in mathematics lessons are based on games, with little or no opportunity for students to develop their problem solving skills or being able to reflect on their learning.

### Planning considerations

There are several things to think about when considering the integration of iPads into teaching and learning mathematics. The following is a brief list:

- What specifically do you want students to learn (content and/or proficiencies)?
- What types of activities/tasks help students learn this content? (Don't forget the importance of including concrete materials.)
- What function of the iPad could you utilise to *enhance* teaching and learning? (If the iPad does not add anything to the lesson, then perhaps reconsider using it.)
- How will you integrate the iPad into the lesson structure? Will the lesson begin with a whole class demonstration using projection onto an interactive whiteboard?
- How many iPads will you need? (This often depends on how many you have available.)
- Should each child have a device, or is it better for students to share a device? (Sharing promotes reasoning and supports the development of mathematical language.)
- How will the students be grouped?
- Will all students be engaged in exactly the same task using the iPads, or will there be a range of tasks that address the same mathematical content?
- How will you know if students are engaging with the mathematics of the lesson? (Sometimes iPads can be distracting.)
- How will you collect evidence of student learning?

## Two tasks to try

The *Geometry Treasure Hunt* (Figure 1) is an example of an interesting and engaging use of iPads to assess students' understanding of two-dimensional shapes. The task incorporates the built-in camera and photo apps as well as the free, *Explain Everything* app that allows students to annotate photographs and capture their audio explanations. Students' work can be replayed as a short video and shared via an interactive whiteboard. The advantage of this task is that it allows students to access the proficiency strands of *Understanding* and *Reasoning* and is open-ended enough to allow the majority of students the opportunity to achieve success. The task is also engaging as it is highly operative, includes cognitive challenge, and makes links to mathematics beyond the classroom.

*Temple Run* is a free game app that keeps a record of achievements (Figure 2) and

also allows players to purchase upgrades and utilities using coins collected from each game played (Figure 3). This game provides many opportunities to 'play' with numbers and build *Fluency*, and is an excellent lesson starter to tune students in to thinking about mathematics. The use of a game, and the use of numbers that have been generated by the students make this an engaging platform for some rich mathematical thinking. The following are a few suggested ideas that can be used with the *Temple Run* app (beginning with students playing one game at the beginning of a lesson to generate some scores):

- Order the scores within your group from lowest to highest.
- Write out your score in words.
- Write out your score using expanded notation
- Calculate your group's mean score.
- Add the total scores in your group.
- Round your score to the nearest ten/hundred/thousand.
- Is your score an even number or an odd number?
- Is your score a multiple of 3/4/6/8?
- Who ran the furthest distance in your group?
- What is the total distance your group ran?
- Convert your total distance to kilometres/centimetres.
- Investigate how many times you would need to run around the perimeter of your school playground if you had to run the distance of your group's total. The class total?
- What can you buy with the coins you have saved?
- How many more coins do you need to make a purchase?



Figure 2.



Figure 3.

There are many more creative ideas for using apps such as *Temple Run* and *Explain Everything* and other non-mathematics based apps to provide mathematics tasks that have purpose and incorporate appropriate challenge for students. In future issues of *Australian Primary Mathematics Classroom* we will continue to share other creative uses of iPads to teach and learn mathematics.

## References

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